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FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 2, 15, 74, 87, and 90

[GN Docket Nos. 14-166, 12-268, ET Docket No. 14-165; FCC 17-95]

Promoting Spectrum Access for Wireless Microphone Operations

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Commission addresses several petitions for reconsideration regarding recent decisions regarding wireless microphones. Specifically, the Commission makes technical revisions to the spurious emission limits that it had adopted for licensed wireless microphone operations in several frequency bands, and for unlicensed wireless microphone operations in the TV bands and in the 600 MHz guard band and duplex gap. The Commission also clarifies output power measurements and how certain antenna-related part 15 rules apply with respect to unlicensed wireless microphones, and revises and clarifies requirements for existing and legacy unlicensed wireless microphones during and after the post-incentive auction transition period. This action promotes the Commission's goal of accommodating wireless microphone users' needs through access to spectrum resources following the incentive auction and reconfiguration of the TV bands.

DATES: Effective [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], except for amendments to §§ 74.803(c) and (d), which contain new or modified information collection requirements subject to the Paperwork Reduction act of 1995 (PRA), Public Law 104-13, that are not effective until approved by the Office of Management

and Budget (OMB). The Commission will publish a document in the **Federal Register** announcing the effective date once OMB approves.

The incorporation by reference of certain material listed in the rule was approved by the Director of the Federal Register as of December 17, 2015.

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SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Order on Reconsideration, GN Docket No. 14-166, ET Docket No. 14-165, GN Docket No 12-268, FCC 17-95, adopted July 13, 2017, and released July 14, 2017. The full text of this document is available for inspection and copying during normal business hours in the FCC Reference Center (Room CY-A257), 445 12th Street SW., Washington, DC 20554. The full text may also be downloaded at: http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0714/FCC-17-95A1.pdf. People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

Synopsis

1. Overview. In the Order on Reconsideration, the Commission addresses four petitions for reconsideration of the Wireless Microphones R&O, 80 FR 71702, November 17, 2015, concerning licensed wireless microphone operations in the TV bands, the 600 MHz “duplex gap,” and several other frequency bands; as well as three petitions for reconsideration of the TV Bands Part 15 R&O, 80 FR 73043, November 23, 2015, concerning unlicensed wireless microphone operations in the TV bands, the 600 MHz guard bands and duplex gap, and the 600

MHz service band. These petitions involved several overlapping technical and operational issues concerning wireless microphones, the Commission consolidated them in this one order.

2. Specifically, the Order on Reconsideration makes technical revisions to the spurious emission limits that the Commission had previously adopted for licensed wireless microphone operations in several frequency bands, and for unlicensed wireless microphone operations in the TV bands, 600 MHz guard band, and duplex gap. With respect to licensed and unlicensed wireless microphone operations in the TV bands, the 600 MHz guard band and duplex gap, and the 600 MHz service band (during the post-auction transition period), the Order on Reconsideration clarified the applicable output power measurements; clarified how certain antenna-related part 15 rules apply with respect to unlicensed wireless microphones; and revises and clarified the requirements for existing and legacy unlicensed wireless microphones during and after the post-auction transition period. In addition, with respect to licensed wireless microphone operations in other frequency bands, the Order on Reconsideration adopted revisions to the channelization plan for licensed wireless microphone operations in the 169-172 MHz band, generally affirms but provides clarifications regarding the 30-megahertz limit placed on licensed wireless microphone users' access to spectrum in the 1435-1525 MHz band, and clarified coordination requirements and operational limitations for licensed wireless microphone operations in the 941.5-944 MHz band.

3. The Order on Reconsideration also terminated three proceedings (WT Docket Nos. 06-166 and 08-167; ET Docket No. 10-24), begun in 2008 and 2010, that concerned various wireless microphone issues. All of the issues that remained in those proceedings have been subsumed in the proceedings addressed in the instant Order on Reconsideration.

4. First, the Commission addressed issues concerning the spurious emission limit

that applies with respect both to licensed wireless microphones that operate pursuant to the Commission's part 74 LPAS rules in the TV bands and the 600 MHz duplex gap, as well as in several other frequency bands (i.e., the 941.5-944 MHz band, 944-952 MHz band, portions of the 952-960 MHz band, the 1435-1525 MHz band, and portions of the 6875-7125 MHz band) and to unlicensed wireless microphone operations in the TV bands and the 600 MHz guard band and duplex gap. The Commission then discussed issues that pertain to rules adopted for licensed and unlicensed wireless microphone operations in the TV bands and the 600 MHz guard band and duplex gap. Specifically, these include: (1) the output power measurement for licensed wireless microphone operations in the VHF TV Band, and for unlicensed wireless microphone operations throughout the TV Bands (both VHF and UHF); (2) the output power levels for wireless microphone operations in the 600 MHz guard bands and duplex gap; (3) the applicability of part 15 antenna connector rules for unlicensed wireless microphone operations; (4) the operation of existing or legacy unlicensed wireless microphone equipment after the end of the post-auction transition period; and (5) whether certain wireless microphone users that operate on an unlicensed basis can reserve TV channels in the white spaces database to protect their operations from interference. The Commission followed with a discussion of rules concerning licensed wireless microphone operations, respectively, in the 169-172 MHz band and in the 1435-1525 MHz band. In addition to addressing the petitions for reconsideration, the Commission clarified the coordination procedures and operational limitations for licensed wireless microphone operations in the 941.5-944 MHz band. Finally, the Commission updated various rule parts in part 15 and part 74 concerning wireless microphones to reflect the 600 MHz Band Plan, as well as the specific calendar dates for compliance with various requirements, that became effective with the closing of the incentive auction on April 13, 2017.

5. Spurious Emission Limits. To promote more efficient use of available spectrum

by wireless microphones, the Commission adopted new emission mask rules in 2015 for licensed and unlicensed wireless microphones that operate in certain frequency bands. On reconsideration, the Commission replaced the spurious emission limits that were adopted with the ETSI spurious emission limits for licensed and unlicensed wireless microphones. Specifically, the Commission will require emissions more than one megahertz above and below a wireless microphone carrier frequency (i.e., outside the defined ETSI mask) to comply with the limits in section 8.4 of ETSI EN 300 422-1. The limit in the majority of the TV bands, including the 600 MHz Band, is four nanowatts (-54 dBm) effective radiated power (ERP), the limit at all other frequencies below 1,000 MHz is 250 nanowatts (-36 dBm) ERP, and the limit at frequencies above 1,000 MHz is 1 microwatt (-30 dBm). In revising our rule to reflect the ETSI spurious emission limits, the Commission also harmonized with the standards that apply to this industry in other countries.

6. Output Power Measurement for Licensed Wireless Microphone Operations in the VHF TV Band. In the Wireless Microphones R&O, the Commission sought to provide more opportunities for licensed wireless microphone operations in the VHF TV band. The Commission reasoned that revising the applicable power limits to 50 mW EIRP would be an effective way to allow wireless microphone manufacturers to adjust the conducted power output of wireless microphones to compensate for low antenna efficiency in the VHF band, and would enable greater use of this portion of the TV bands by reducing the need for a relatively large antenna, which could impede making productive use of this spectrum. It also noted that specified the applicable power limit in terms of EIRP for licensed wireless microphone operations in the VHF band would provide uniformity in the VHF band for both licensed

wireless microphone operations under part 74 and unlicensed wireless microphone operations under part 15, as the TV Bands Part 15 R&O also specified the power limit in terms of EIRP.

7. The Commission clarified that manufacturers may show compliance with the 50 mW EIRP limit for licensed wireless microphones operating in the VHF band by making either radiated or conducted measurements. The Commission did not intend to unnecessarily restrict use of this band for certain types of wireless microphone applications. Permitting different options for measuring output power raises no interference concerns, because either method can be used to determine the EIRP of a wireless microphone. Finally, because the Commission also clarified that for unlicensed wireless microphone operations in the TV bands (VHF and UHF) output power can be measured in either a conducted or radiated test configuration for comparison to the 50 mW power limit, as discussed immediately below, our output power requirements for wireless microphone operations in the VHF band, whether for licensed or unlicensed operations, will be uniformed.

8. Output Power Measurements for Unlicensed Wireless Microphone Operations in the VHF and UHF TV Bands. In the TV Bands Part 15 R&O, the Commission adopted rules to permit unlicensed wireless microphone operations with a power level of up to 50 mW EIRP in the TV bands, both the VHF and UHF bands. On reconsideration, the Commission addressed clarified that wireless microphone manufacturers may show compliance with the 50 mW power limit for unlicensed wireless microphones operating in the VHF or UHF band by making either conducted or radiated measurements. The Commission agreed with petitioners that permitting wireless microphone manufacturers the flexibility to determine compliance with the limit through either conducted or radiated emission measurements would best serve our goal of promoting opportunities for different types of unlicensed wireless microphone applications.

9. The Commission recognized that there is a difference in how the power limits are specified in the rules for licensed and unlicensed wireless microphones in the UHF TV band (conducted power vs. EIRP), but find that the flexibility that the Commission allowed to make either conducted or radiated measurements to meet the respective limits will allow wireless microphone manufacturers to use the same test methodology to demonstrate the compliance of both licensed and unlicensed wireless microphones. Either measurement approach can reliably establish compliance with the EIRP limits for wireless microphones.

10. Finally, while the Commission had not specifically required the use of the ETSI EN 300-422-1 output power measurement procedures, the Commission recognized that this standard allowed the option of either conducted or radiated power measurements for wireless microphones. Thus, the flexibility that the Commission allowed a wireless microphone manufacturer in choosing the method of power measurements is consistent with the method employed in other countries in the global marketplace. This flexibility also is consistent with the American National Standards Institute (ANSI) C63.10-2013 measurement procedure that the Commission uses for testing part 15 intentional radiators, as well as Office of Engineering and Technology published guidance for measurements relating to EIRP limits.

11. Output Power Levels for Wireless Microphone Operations in the 600 MHz Guard Bands and Duplex Gap. In the TV Bands Part 15 R&O, the Commission provided for unlicensed wireless microphone operations in the 600 MHz guard bands and in one portion of the duplex gap under specified technical rules, and provided for licensed wireless microphone operations under the same technical rules in another portion of the duplex gap. In these bands, it limited all wireless microphone operations to an output power level of 20 mW EIRP.

12. The Commission denied requests to increase the 20 mW EIRP power level of wireless microphones that will operate in the 600 MHz guard band and duplex gap. The Commission chose this power level to avoid interference to licensed wireless services in the adjacent bands based on a detailed technical analysis described in the TV Bands Part 15 R&O.

13. The Commission noted that operating in the 600 MHz guard band and duplex gap is only one of several options for wireless microphone users. Users that may need more power for their various applications can use available spectrum in the TV bands where a maximum of 50 mW and 250 mW are permitted on an unlicensed and licensed basis, respectively. The Commission will allow manufacturers of licensed and unlicensed wireless microphones that operate in the 600 MHz guard band and duplex gap the option to demonstrate compliance with the 20 mW EIRP power limit through either conducted power or radiated measurements.

14. Unlicensed Wireless Microphones and Part 15 Antenna Connector Rules. In the TV Bands Part 15 R&O, the Commission codified the rules for unlicensed wireless microphone operations in the TV bands under § 15.236 of the Commission's rules, and provided for a transition period after which these unlicensed users may only use part 15-certified wireless microphones. Upon consideration of petitions for reconsideration, the Commission exempted unlicensed wireless microphones operating under § 15.236 from the antenna connector restrictions set forth in § 15.203. Requiring unique antenna connectors for wireless microphones certified under part 15 is impractical because they have different application requirements when compared with other consumer products authorized under part 15. Such applications, which require the use of detachable antennas and may be critical for operating wireless microphones, could be inhibited if each make or model of wireless microphone used different connectors. The Commission believed that exempting part 15 wireless microphones from the requirements of §

15.203 is not likely to result in harmful interference since wireless microphones with standard antenna connectors have been approved for use for many years under part 74 of the rules, and the Commission has permitted unlicensed use of such equipment since 2010 with no demonstrated cases of abuse (e.g., adding high-gain antennas or external amplifiers) resulting in harmful interference to other services.

15. Because the licensed and unlicensed wireless microphones that operate in the TV bands generally are the same devices (though higher power is permitted in the UHF band for licensed wireless microphones), the Commission expects that many unlicensed wireless microphones will also be certified under part 74, which does not require permanently attached antennas or unique antenna connectors. Also, many of the same types of entities that operate wireless microphones on a licensed basis under part 74 (e.g., theater groups, musical productions) will operate wireless microphones on an unlicensed basis under part 15, either because they do not meet the threshold for part 74 licensing eligibility, or because certain frequency bands (the 600 MHz guard band and a portion of the duplex gap) are available only for unlicensed use. For the reasons stated above, the Commission found that it should exempt unlicensed wireless microphones from the requirement in § 15.203 that the device must incorporate a permanently attached antenna or a unique antenna connector. By doing so, the Commission has harmonized the part 15 and 74 rules in this respect, which will foster efficiency in the design and manufacture of wireless microphones.

16. The Commission had not exempted unlicensed wireless microphones from the requirements of § 15.204 because these requirements are necessary to ensure that manufacturers provide information about the types of antennas and cables that may be used with a device to ensure compliance with the EIRP limits applicable to unlicensed wireless microphones (as

discussed above). The Commission found that the current equipment authorization rules and procedures, described in more detail below, are not overly burdensome and provide sufficient flexibility to address Shure's concerns with respect to the certification of in-ear monitors.

17. As a general matter, applicants for certification must test equipment for compliance in the worst-case configuration as determined by the manufacturer, e.g., using the highest gain of each antenna type as required by § 15.204(c) and, where use of a cable is involved, the lowest loss cable associated with each antenna type, to ensure that the system is operated at radiated power output levels in compliance with the rules. Operators of certified equipment must use an antenna with the same or lower gain, and a cable with the same or higher loss, than was approved with the system. The Commission does not believe that this approach is burdensome for equipment manufacturers or users since it does not require testing of every possible antenna and cable combination, and it gives users the ability to use different antennas or cable lengths within the limits of what the equipment certification allows.

18. The Commission recognized that, in practice, the length of the cables used for particular scenarios can differ. For instance, in cases where a cable that is significantly longer than the one with which the equipment was certified must be used, the higher cable loss could reduce the EIRP significantly below the maximum permitted by the rules. To the extent that part 15 certified equipment will be professionally installed, existing procedures allow the installer to configure the equipment in accordance with the manufacturer's instructions to ensure that the equipment will comply with the part 15 rules in the configuration in which it will be used. The professional installer can thus compensate for factors such as higher cable loss to ensure that the equipment operates at up to, but no greater than, the power levels permitted by the rules. While an applicant for certification of equipment that will be professionally installed must submit

certain additional information (e.g., a justification for professional installation and a description of instructions to installers), the Commission does not believe these requirements are overly burdensome on applicants.

19. Operation of Existing or Legacy Wireless Microphone Equipment after End of Post-Auction Transition Period. The Commission clarified the applicable rules for unlicensed wireless microphone users with regard to continued operation of part 74-certified equipment during the post-auction transition period and after the end of this period. The Commission also discussed procedures by which existing/legacy equipment that has been certified under part 74, such as that which has been designed to operate in portions of the 600 MHz service band, can be modified in the field by the manufacturers for use under the new part 15 rules, and the conditions under which unlicensed wireless microphone users may continue to use any existing/legacy part 74-certified equipment.

20. First, the Commission clarified that unlicensed wireless microphone users can continue to operate equipment that had been certified under part 74, including equipment that can operate in portions of what becomes the 600 MHz service band following the auction, until the end of the 39-month post auction transition (provided other conditions for operation are met). After this transition period, however, unlicensed wireless microphone users are only authorized to operate wireless microphone equipment that has been certified under our part 15 rules, either as new equipment or as existing/legacy part 74-certified equipment that now complies with the part 15 rules (and thus would not be capable of operating in the 600 MHz service band, and instead would be designed to comply with the applicable technical rules, including authorized output power levels, for unlicensed operations in the TV bands or in the 600 MHz guard band and duplex gap). The Commission concluded that this approach will achieve an orderly

transition following the auction that balances the needs of current unlicensed wireless microphone users, who otherwise could incur unduly burdensome costs in discarding equipment that can effectively be modified to comply with the applicable part 15 requirements, and the needs of the future 600 MHz service band licensees that will be providing wireless service in the coming years. The Commission noted that, during the 39-month post-auction transition period, unlicensed wireless microphone users must check the white spaces databases, prior to operating in the 600 MHz service band, to identify the channels available for use at their particular locations, which is a requirement designed to protect any 600 MHz service licensee that commences operations or conducts first field application (FFA) testing during this period.

21. The Commission also revised our requirements concerning the use by unlicensed wireless microphone users of existing/legacy equipment that was originally certified under part 74 and designed to operate on frequencies that include frequencies in the 600 MHz service band. Specifically, to the extent that such equipment can be, and is, effectively modified (e.g., through software changes) and certified as compliant with the new part 15 rules, the Commission will permit unlicensed wireless microphone users to continue to use the modified equipment, which will only operate on frequencies permitted for their use, after the end of the post-auction transition period. Accordingly, the Commission allowed manufacturers to modify this existing part 74-certified wireless microphone equipment so that the equipment is no longer capable of operating in the 600 MHz service band and can be certified under the part 15 rules (for operation in the TV bands and the 600 MHz guard band and duplex gap under prescribed rules, including compliance with the applicable output power limits and ETSI emission mask). If, for instance, these modifications can be accomplished through software changes to devices that remain in the field (e.g., through downloaded software changes), then the Commission will permit

manufacturers to obtain approval through the permissive change process, and indicate under the existing FCC ID number for that device that, with the modification, the device would be part 15 compliant. Similarly, for any existing/legacy part 74-certified equipment that originally was designed to operate only in parts of the current TV bands that remain available for unlicensed wireless microphone operations but would not otherwise be compliant with the new part 15 rules, the Commission allowed wireless microphone manufacturers to modify such equipment to make necessary changes (e.g., modifications to comply with the specified lower output power limits in the guard bands and duplex gap) so that it can comply with the part 15 rules for such use. To the extent that no equipment modification or hardware changes are necessary (e.g., the existing/legacy equipment operates only on reconfigured TV band spectrum) and the equipment meets the other technical requirements for part 15 operations (e.g., maximum output power levels and ETSI emission mask), then the manufacturer can file the necessary application for permissive change to establish this, and the record associated with the FCC ID number for this previously certified part 74 device can be updated to reflect that the device is compliant with the part 15 rules. After the end of the post-auction transition period unlicensed wireless microphone users will be permitted to operate existing/legacy wireless microphone equipment provided that the necessary steps have been taken so that it has been certified as compliant with the applicable part 15 rules.

22. If, however, the existing equipment that operates in the 600 MHz service band cannot be modified to comply with the part 15 rules, the unlicensed wireless microphone users will continue to be prohibited from operating that device after the end of the 39-month post-auction transition period. This requirement is consistent with our general part 15 requirement that unlicensed equipment must be constructed such that controls readily accessible to the user

cannot cause the equipment to operate in violation of the technical rules. The Commission found that, after the end of the post-auction transition period, requiring unlicensed wireless microphone users to operate equipment that has been certified as compliant with the part 15 rules (e.g., equipment that necessitated modification with respect to elimination of operations in the 600 MHz service band, or equipment that meets the output power limits of 20 mW EIRP if operating in the guard band or unlicensed portion of the duplex gap) is an appropriate and balanced approach that achieves our goal of ensuring that unlicensed wireless microphone operations in the future will not cause harmful interference to new 600 MHz wireless services or to broadcast licensees operating in the TV bands.

23. Wireless microphone manufacturers will have a critical role to play with respect to ensuring that unlicensed users can determine whether they can continue to use existing/legacy devices after the end of the post-auction transition period. Wireless microphone manufacturers have the requisite knowledge about their respective companies' wireless microphone devices. To meet their obligations, unlicensed users seeking to operate existing/legacy equipment will need to know whether their particular devices can be, and ultimately are, certified as part 15 compliant. Accordingly, the Commission expects that all wireless microphone manufacturers make the necessary information available about their existing/legacy models so that users can determine what is required of them in order to meet their respective obligations. This information should include information on their companies' particular devices, including (1) which devices will need to be modified, through hardware and/or software changes, to comply with part 15 requirements in order to be certified as part 15-compliant, and the process by which the manufacturers and the unlicensed users will achieve this; (2) which devices will not need to be modified to comply, but will be certified as compliant with the part 15 rules during the

transition period; and (3) which devices will not comply, and cannot be certified as compliant with part 15 requirements (and accordingly cannot be used after the end of the post-auction transition period). Providing this information can be achieved in different ways, such as posting the necessary information on websites, ensuring that customer helplines can help inform users, or contacting known customers directly, depending on the situation.

24. Unlicensed wireless microphone users with existing/legacy part 74-certified equipment also must do their part by examining their various devices and taking any necessary actions to ensure that, after the end of the post-auction transition, they only operate such microphones that comply with part 15 requirements. They should be in contact with the manufacturer(s) of their wireless microphones to obtain information on their particular devices, the extent to which they can be made to comply with the part 15 requirements, and the steps they should take to modify any devices to bring them into compliance. Unlicensed wireless microphone users must ensure that any existing/legacy device that they plan to use complies with the part 15 requirements and has been so certified (either because it has been modified, where necessary, or otherwise has been certified as compliant with the part 15 requirements with respect to the particular frequencies on which it operates), and that they cease operating any other wireless microphone devices that do not comply with the part 15 requirements. The Commission noted that, as wireless microphone manufacturers develop new devices that comply with the part 15 rules for operations in the TV bands, the 600 MHz guard band, and the duplex gap, unlicensed wireless microphone users who need to replace particular existing/legacy wireless microphones will be able to obtain new part 15-compliant microphones before the end of the 39-month post-auction transition period to access the spectrum available for such operations.

25. Finally, the Commission reminded manufacturers, and entities that sell, lease, or offer for sale or lease wireless microphones, that marketing of any unlicensed or licensed wireless microphones that do not comply with the part 15 or revised part 74 rules (respectively) must cease no later than 18 months after release of the Channel Reassignment PN (i.e., October 13, 2018). Thus, to the extent that existing/legacy wireless microphones that were originally designed to operate on any frequencies that will no longer be available for use (e.g., devices that are capable of operating on portions of the 600 MHz service band) as a result of the incentive auction, such devices cannot be sold or leased unless the device subsequently has been modified to comply with the new part 15 and/or the revised part 74 requirements for wireless microphone operations. The Commission directed the Consumer and Governmental Affairs Bureau (CGB), working with the Office of Engineering and Technology (OET) and the Wireless Telecommunications Bureau (WTB), to include discussion of these issues associated with the use of existing and legacy wireless microphones as part of its overall consumer outreach efforts pertaining to the transition of unlicensed and licensed wireless microphone operations that will follow the incentive auction and reconfiguration of the existing TV bands.

26. Registration of Certain Unlicensed Wireless Microphone Users in the White Spaces Database. Under our rules, licensed wireless microphone users operating in the TV bands (and the 600 MHz service band during the post-auction transition period) are permitted to register their operations on available channels at specified locations and times, in the white spaces databases in order to protect their operations from potential interference from unlicensed white space devices. In codifying rules for unlicensed wireless microphone operations underpart 15 in the TV Bands Part 15 R&O, the Commission eliminated the rule adopted in 2010 that had permitted certain qualifying unlicensed wireless microphone users also to register their

operations for such protection. It determined that their unlicensed operations should be subject to the same general conditions as apply to unlicensed white space devices (i.e., they may not cause interference to authorized services and must accept any interference from other unlicensed devices) as it sought to balance the interests between the licensed and unlicensed entities' access to the spectrum in the reconfigured TV bands.

27. While the Commission agreed that professional theater, music, and performing arts organizations that operate unlicensed wireless microphones to deliver high quality sound for their audiences serve important needs, the Commission nonetheless declined here to grant Shure's petition insofar as it requests that the Commission to revise the new part 15 rules to permit unlicensed wireless microphone users to register their unlicensed operations for protection from other unlicensed operations in the TV bands. The Commission concluded that allowing these unlicensed users to obtain interference protection would be inconsistent with their unlicensed status. The Commission instead sought to address the concerns raised in the petition through Further Notice.

28. In the several actions that the Commission has taken related to the incentive auction and the reconfiguration of the TV bands, it has sought to balance different users' needs for access to spectrum. In the Commission's considerations regarding wireless microphones, it has recognized that following the incentive auction there will be fewer channels in the TV bands available for both wireless microphone and white space device operations. In expanding the eligibility for part 74 wireless microphone licenses in 2014 to include professional sound companies and owners and operators of large venues that routinely use 50 or more wireless microphones in major events or productions, the Commission sought to address the needs of many unlicensed wireless microphone users that have similar needs to the other part 74 wireless

microphone licensees to provide high quality audio services for large scale performances and events. And, in codifying the rules for unlicensed wireless microphone operations under part 15 in the TV Bands Part 15 R&O in 2015, the Commission concluded it best, from a regulatory policy standpoint, to place all unlicensed users – whether wireless microphone or white space device users – under the same general unlicensed status vis-a-vis both unlicensed and licensed operations (i.e., unlicensed users may not cause harmful interference to authorized services and must accept any interference from other unlicensed devices). The Commission continued to view this as the best approach for unlicensed wireless microphone users that operate under the part 15 rules for unlicensed operations.

29. Although The Commission had denied the petition insofar as Shure requests that the Commission permit wireless microphone users that operate on an unlicensed basis to register for interference protection, the Commission understands that some entities that currently operate wireless microphones on an unlicensed basis may have needs identical or similar to the professional sound company/large venues that qualify for part 74 wireless microphone licenses for operation in the TV band spectrum. As the Commission concluded when expanding the part 74 license eligibility in 2014 for operation in the TV band, the routine use of 50 microphones is a “reasonable threshold” for identifying those entities that are more likely to require interference protection in order to ensure high-quality audio services for their productions. No party sought reconsideration of this particular threshold established in that proceeding, and the Commission cannot revisit that threshold absent additional notice. The Commission did, however, believe that some number of entities with identical or similar needs may be able to demonstrate to the Commission, on a case-by-case basis, that they may merit obtaining a part 74 license for operations on vacant TV channels at particular venues at specified times, such that they should

be permitted to register available TV channels for that purpose. These entities may use fewer wireless microphones but otherwise have the same needs as licensees that operate on TV channels, or the wireless microphones may be needed for major events or productions at a location with very limited spectrum availability. Accordingly, the Commission has adopted a Further Notice in these proceedings in which the Commission proposed a path that will enable such qualifying entities to obtain a license under our part 74 LPAS rules. Considering that the phased broadcast station transitioning to the repacked TV bands begins next year, the Commission intends to act quickly to issue an order addressing the proposal set forth in the Further Notice.

30. Licensed Wireless Microphone Operations in the 169-172 MHz Band. In the Wireless Microphones R&O, the Commission sought to promote more expansive use of spectrum in the 169-172 MHz band for licensed wireless microphone operations, which are authorized on a secondary basis, and to do so in a manner that does not interfere with the primary Federal operations or other secondary non-Federal services operating in the band. The Commission agrees with Sennheiser and other wireless microphone manufacturers that the Commission should take steps to increase the usefulness of the 169-172 MHz band for wireless microphones by permitting wireless microphone operations under a different channel plan, one that eliminates intermodulation effects and thereby enables full use of the 54- and 200-kilohertz (narrowband and broadband) channels throughout the band.

In revising the Commission's rules, the Commission promoted the goals set forth in the Wireless Microphones R&O to find additional ways to accommodate wireless microphone operations while protecting other licensed operations in the 169-172 MHz band, such as operations on forest fighting channels. In particular, the Commission revised the center frequencies associated with

two of the 200-kilohertz channels, shifting the authorization to operate on channels centered at 169.475 MHz and 170.275 MHz to 169.575 MHz and 170.025 MHz, and the Commission permit 54-kilohertz operations on four new channels that would correspond with these 200-kilohertz channels, specifically authorizing such wireless microphone operations on frequencies centered at 169.545 MHz, 169.605 MHz, 169.995 MHz, and 170.055 MHz. The Commission did not, however, revise its rules to eliminate the current authorizations to operate 54-kilohertz wireless microphones on the channels centered at 169.445 MHz, 169.505 MHz, 170.245 MHz, and 170.305 MHz. These channels will remain available for licensees that do not choose to obtain wireless microphones designed to operate on the newly-available channels. The approach the Commission has taken serves to provide additional opportunities for wireless microphone licensees that purchase new equipment that can make full and efficient use of the band, whether for professional-quality 200-kilohertz microphones or for 54-kilohertz wireless microphones, while at the same time continues to allow other licensees to operate 54-kilohertz wireless microphones on any of the current 54-kilohertz channels. The Commission noted that certain of the 54-kilohertz channels under our existing rules may overlap with one of the revised 200-kilohertz channels, and that operations on some of the existing 54-kilohertz channels potentially could continue to create intermodulation effects that could limit the full use of the 169-172 MHz band for wireless microphone operations. Under existing requirements, all wireless microphone applicants and licensees must cooperate in the selection and use of frequencies in order to reduce interference and make the most effective use of the authorized facilities. And, considering that wireless microphone users will be operating devices that operate at low power and transmit only short distances, and that the other operations in the band are not likely in the same areas, we do not anticipate that interference issues are likely to arise as a practical matter. In any event, the

Commission expects that different licensees that potentially could suffer or cause interference to one another to cooperate and resolve any potential problem by mutually satisfactory arrangements.

31. Licensed Wireless Microphone Operations in the 1435-1525 MHz Band. In the Wireless Microphones R&O, the Commission authorized limited use of the 1435-1525 MHz band for licensed wireless microphone operations on a secondary basis in the band, provided that certain conditions and safeguards designed to protect the primary Aeronautical Mobile Telemetry (AMT) services in the band are met. It observed that the Commission's experience through the Special Temporary Authority (STA) process demonstrates that, under proper conditions, wireless microphones will be able to operate in this band without interfering with AMT operations. The Commission limited eligibility to professional users licensed under our part 74 LPAS rules, and emphasized that it was not opening up this band either for widespread use or for itinerant uses throughout the nation. It restricted use to specific fixed locations, such as large venues where there is a need to deploy large numbers of microphones (typically 100 or more) for specified time periods and indicated that access to the band is intended for situations in which the other available spectrum resources are insufficient.

32. On reconsideration, the Commission affirmed the decision establishing a 30 megahertz limit on the amount of spectrum available for wireless microphone operations in the 1435-1525 MHz band at a particular location. The Commission did, however, provide clarifications regarding how this limitation applies with respect to different wireless microphone users and to particular areas of operations, which should help accommodate more wireless microphone users that operate in the same general area and have a need for access to spectrum in this band. In those few extraordinary instances in which a particular licensed wireless

microphone user can demonstrate that access to more than 30 megahertz of this band for a specified event is merited, the STA process remains available for addressing those needs.

33. In the Wireless Microphones R&O, the Commission stated that “all wireless microphones operating in a particular area” would be limited to access to no more than 30 megahertz in the 1435-1525 MHz band. In affirming the decision to place a limit on the amount of spectrum available for wireless microphone use in a particular area, we clarify that this 30-megahertz limit will be applied to each licensed wireless microphone user seeking access to spectrum in the 1435-1525 MHz band for its own wireless microphone operations at a particular location or venue. The Commission concluded that the 30 megahertz limitation as clarified is reasonable and consistent with the Commission’s goals associated with operations in this band. The Commission disagreed with petitioners who argue there was insufficient notice or basis in the record for adopting a 30-megahertz limitation in the first place. In the Wireless Microphones NPRM, the Commission proposed only limited use of the 1435-1525 MHz band for wireless microphone use, stated that it was not proposing to open the band to widespread use, and noted its overarching goal of promoting efficient use of spectrum when accommodating wireless microphone operations. In response to the notice, and as discussed in the Wireless Microphones R&O, some commenting parties expressed concerns that accommodation of wireless microphones in the band not limit other secondary uses of the band (i.e., video services that access the band through the STA process), or objected to the Commission making the entire 90 megahertz available for wireless microphone use. While the Commission did not specifically propose a 30-megahertz limit, the Commission made clear that in addition to its proposal regarding potential limits (e.g., restricting operations to specific, fixed locations at specific times) it would consider “alternative proposals” on “any other regulatory or technical issues relevant to

consideration” of whether to authorize wireless microphone operations in the 1435-1525 MHz band. As evidenced by commenter objections to making the entire 90 megahertz in the band available for wireless microphone use, this guidance was sufficient to apprise interested parties that the Commission might consider additional limitations for wireless microphone operations (like the 30-megahertz limitation) on the amount of spectrum that a licensee could access under a given license. As such, the Commission’s decision to adopt the 30-megahertz limitation was, at a minimum, a logical outgrowth of the proposals made in the Wireless Microphones NPRM, and thus complied with notice requirements.

34. Moreover, the record contains ample basis to support the balance that the Commission sought to achieve when establishing the 30-megahertz limitation for operations in this band – i.e., accommodating wireless microphone operations through access to spectrum in this band along with other bands, while also promoting efficient spectrum use. By limiting a particular operator to access to no more than 30 megahertz of the spectrum in this band, we also promote our goals concerning efficient use of the spectrum in this band, and we help ensure that other licensed wireless microphone users can access portions of this spectrum for their needs as well. While there may be extraordinary situations or special events in which access to 30 megahertz in this band may be insufficient, for which the STA process remains available (as discussed below), we are not persuaded by petitioners that we should remove the general limitation and instead provide a particular user with general access to all 90 megahertz of spectrum in the band. In sum, we conclude that a 30-megahertz limitation is balanced and reasonable, particularly with the clarification that follows regarding implementation of this limitation.

35. The Commission also clarified how this general limitation will apply to different licensed wireless microphone users that may operate in the same general area or location. The Commission recognized, as noted by the petitioner and commenters above, that in some areas of the country the spectrum available for licensed wireless microphone operations may be quite constrained (e.g., the theater district in New York City, or the Las Vegas strip). The Commission also recognized that different users in that same general area or location may be seeking to access portions of the same general spectrum resource for their respective wireless microphone operations at a particular venue. While the Commission is limiting each wireless microphone user's operations in a particular area or venue to access to no more than 30 megahertz in the band (i.e., one-third of the spectrum in the band), as discussed above, the Commission clarified that different users in the same general area can each access up to 30 megahertz of the spectrum in the band for their respective wireless microphone operations.

36. As discussed above, there may be extraordinary situations for which a licensed wireless microphone user may need access to more than 30 megahertz of spectrum in the band for a specific event at a particular location or area. For any such extraordinary event, the STA process remains available to meet these needs. In keeping with existing requirements for obtaining an STA, the wireless microphone licensee would need to demonstrate that all of the spectrum resources available to it for that event are insufficient to meet its needs. The Commission rejected Shure's request that we eliminate use of STAs in this band for either wireless microphone or video production operations. The Commission recognized that, for particular events, both professional wireless microphone users and professional video production services may seek access to spectrum in the 1435-1525 MHz band through STAs in the same general location or area. To the extent that these different entities may seek access to the 1435-

1525 MHz band at the same location and time for scheduled events, the Commission expected these users to coordinate their audio and video operations.

37. Licensed Wireless Microphone Operations in the 941.5-944 MHz Band. In the Wireless Microphones R&O, the Commission revised its rules to provide new opportunities for licensed wireless microphone operations in the bands adjacent to the 944-952 MHz band, which has long been available for wireless microphone operations under the Commission's part 74 LPAS rules. Given the need to coordinate the wireless microphone operations with the various incumbent primary Federal fixed services that may operate at different frequencies and locations throughout the 941.5-944 MHz band, we provide the following guidance. After coordination of proposed wireless microphone operations with incumbent non-Federal users through the local SBE coordinator, the applicant will file its application for an LPAS license with the Commission. In addition to the basic technical information (such as the particular frequencies and maximum power levels that the applicant proposes to use), the applicant is required to provide a description of the proposed location and area(s) of operation. To facilitate the Commission's coordination of the proposed wireless microphone operations with incumbent Federal users, each application should provide sufficient specificity regarding the proposed location(s) (e.g., venues) of the wireless microphone operations for which the applicant seeks authorization, and limit its request only to the area(s) necessary to meet its particular communications needs. Providing such specificity is consistent with the approach used for coordinating co-primary non-Federal fixed service applications with Federal fixed operations in the band, and also is consistent with the approach taken with regard to secondary licensed wireless microphone operations in the 1435-1525 MHz band. Finally, the Commission noted that, under the applicable LPAS rules, wireless microphone licensees are not granted exclusive frequency assignments for their secondary

operations. Accordingly, the grant of a LPAS license to one entity for wireless microphone operations at a specified location (e.g., a venue) does not preclude the grant of additional LPAS licenses to other entities at the same location following successful coordination of their proposed operations with the primary users of the band.

38. Updating Rules to Reflect 600 MHz Band Plan and Other Miscellaneous Revisions. The broadcast television incentive auction closed on April 13, 2017. As a result, the 600 MHz Band Plan is now finalized, and the specific frequencies associated with the 600 MHz service band, the 600 MHz guard band, and the 600 MHz duplex gap are now established. Accordingly, the Commission updated various rule parts in part 15 (affecting unlicensed wireless microphone operations) and part 74 (affected licensed wireless microphone operations) to reflect the 600 MHz Band Plan. In addition, the Commission updated these rules to reflect specific calendar dates for compliance with various requirements that attach based on the date of release of the Closing and Channel Reassignment PN and the establishment of the post-auction transition period. Finally, the Commission also took this opportunity to reinsert part of a rule provision in § 87.303(d)(1) that had been inadvertently deleted with the rule changes adopted in the Wireless Microphones R&O.

PROCEDURAL MATTERS

39. Paperwork Reduction Analysis. This Order on Reconsideration contains new information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new information collection requirements contained in this proceeding. In addition, we note that pursuant to the Small Business Paperwork Relief Act of

2002 (SBPRA), Public Law 107-198, see 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

40. We have assessed the effects of various changes and clarifications to the Wireless Microphones R&O and TV Bands Part 15 R&O that might impose information collection burdens on small business concerns, and find that those changes and clarifications facilitate licensed and unlicensed wireless microphone use of various frequency bands and provide wireless microphone manufacturers with greater flexibility in designing products to meet market demands. We anticipate no adverse impacts on small business concerns with fewer than 25 employees.

41. Congressional Review Act. The Commission will send a copy of this Order on Reconsideration to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

42. Final Regulatory Flexibility Analysis. The Regulatory Flexibility Act (RFA) requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” According, we have prepared Final Regulatory Flexibility Analysis concerning the possible impact of the Order on Reconsideration on small entities. While the Order on Reconsideration generally upholds the rules adopted in the Wireless Microphones R&O and the TV Bands Part 15 R&O, it makes the changes and clarifications specified above. These changes and clarifications facilitate licensed and unlicensed wireless microphone use of various frequency bands by permitting more flexibility in meeting the technical requirements relating to emission limits, more efficient use of the 169-172 MHz

band, increased access to the 1435-1525 MHz band, and the possibility of interference protection for certain professional unlicensed wireless microphone users; resolving uncertainties in the rules regarding power requirements, when unlicensed microphones can continue to operate equipment certified under part 74, and when wireless microphone applicants must coordinate; and providing wireless microphone manufacturers with greater flexibility in designing products to meet market demands.

43. The Commission anticipates no adverse economic impact on small entities because, with one exception, the changes provide these entities benefits previously unavailable to them, as opposed to mandating new requirements on them. That exception involves the clarification that applicants for LPAS licenses to operate wireless microphones on frequencies in the 941.5-944 MHz band are required to have their proposed operations successfully coordinated with Federal users. However, the Commission believes that this requirement will impose only a de minimis burden. Significant alternatives considered include making no changes to the rules adopted in the Wireless Microphones R&O and in the TV Bands Part 15 R&O or making more extensive changes to those rules. However, the Commission finds that the relatively limited number of changes made in the Order best balances the needs of wireless microphone users and manufacturers and other entities that use the same frequency bands by providing wireless microphone users and manufacturers increased flexibility to meet their requirements in those bands without impairing other entities' access to the bands.

ORDERING CLAUSES

44. IT IS ORDERED that, pursuant to sections 1, 4(i), 4(j), 7(a), 301, 302, 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. 151, 154(i),

154(j), 157(a), 301, 302a, 303(f), 303(g), and 303(r), and section 553(b)(B) of the Administrative Procedure Act, 5 U.S.C 553(b)(B), this Order on Reconsideration IS ADOPTED.

45. IT IS ORDERED that parts 2, 15, 74, 87, and 90 of the Commission's rules, 47 CFR parts 2, 15, 74, 87, and 90, ARE AMENDED as set forth in the Final Rules.

46. IT IS ORDERED that the rules adopted herein WILL BECOME EFFECTIVE **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, except for § 74.803(c) and (d) of our rules, which contains a new information collection requirement that requires approval by the OMB under the PRA, which WILL BECOME EFFECTIVE after the Commission publishes a notice in the Federal Register announcing such approval and the relevant effective date.

47. IT IS FURTHER ORDERED that, pursuant to section 405 of the Communications Act of 1934, as amended, 47 U.S.C. 405, and § 1.429 of the Commission's rules, 47 CFR 1.429, the Petitions for Reconsideration of the Report and Order in GN Docket No. 14-166 and GN Docket No. 12-268, filed by Audio-Technica, U.S., Inc., Sennheiser Electronic Corporation, Lectrosonics, Inc., and Shure Incorporated, and the Petitions for Reconsideration of the Report and Order in ET Docket No. 14-165 and GN Docket No. 12-268, filed by Audio-Technica, U.S., Inc., Sennheiser Electronic Corporation, and Shure Incorporated ARE GRANTED IN PART AND DENIED IN PART to the extent described herein.

48. IT IS ORDERED, pursuant to sections 4(i) and (j) of the Communications Act, as amended, 47 U.S.C. 154(i) and (j), and §§ 0.131 and 0.331 of the Commission's rules, 47 CFR 0.131, 0.331, that WT Docket Nos. 08-166 and 08-167 and ET Docket No. 10-24 ARE TERMINATED.

List of Subjects

47 CFR Part 2

Telecommunications

47 CFR Part 15

Communications equipment

47 CFR Part 74

Incorporation by reference, Reporting and recordkeeping requirements

47 CFR Part 87

Communications equipment

47 CFR Part 90

Business and industry

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch,
Secretary.

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 2, 15, 74, 87, and 90 as follows:

PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation for part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations, is amended as follows:

- a. Revise page 32.

- b. Revise footnotes US84 and US300 in the list of United States (US) Footnotes.

The revisions read as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

| | | | | | |
|--|--|--|---|---|---|
| 5.323 942-960 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 | 5.325 942-960 FIXED MOBILE 5.317A | 5.327 942-960 FIXED MOBILE 5.317A BROADCASTING | 941-944 FIXED US268 US301 G2 944-960 | 941-944 FIXED US84 US268 US301 NG30 NG35 944-960 FIXED NG35 | Public Mobile (22) Aural Broadcast Auxiliary (74E) Low Power Auxiliary (74H) Fixed Microwave (101) |
| 5.323 960-1164 AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328 | | 5.320 | 960-1164 AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328 US224 | | Aviation (87) |
| 1164-1215 AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.328A | | | 1164-1215 AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328A US224 | | |
| 1215-1240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) | | | 1215-1240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) G132 SPACE RESEARCH (active) 5.332 | 1215-1240 Earth exploration-satellite (active) Space research (active) | |
| 5.330 5.331 5.332 1240-1300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur | | | 1240-1300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 SPACE RESEARCH (active) AERONAUTICAL RADIONAVIGATION 5.332 5.335 | 1240-1300 AERONAUTICAL RADIONAVIGATION Amateur Earth exploration-satellite (active) Space research (active) 5.282 | Amateur Radio (97) |
| 5.282 5.330 5.331 5.332 5.335 5.335A 1300-1350 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 RADIONAVIGATION-SATELLITE (Earth-to-space) | | | 1300-1350 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation G2 US342 | 1300-1350 AERONAUTICAL RADIONAVIGATION 5.337 US342 | Aviation (87) |
| 5.149 5.337A 1350-1400 FIXED MOBILE RADIOLOCATION | 1350-1400 RADIOLOCATION 5.338A | | 1350-1390 FIXED MOBILE RADIOLOCATION G2 5.334 5.339 US342 US385 G27 G114 1390-1395 | 1350-1390 5.334 5.339 US342 US385 1390-1395 FIXED MOBILE except aeronautical mobile 5.339 US79 US342 US385 NG338A | Wireless Communications (27) |
| 5.149 5.338 5.338A 5.339 | 5.149 5.334 5.339 | | 5.339 US79 US342 US385 | | Personal Radio (95) |

* * * * *

UNITED STATES (US) FOOTNOTES

* * * * *

US84 In the bands 941.5-944 MHz and 1435-1525 MHz, low power auxiliary stations may be authorized on a secondary basis, subject to the terms and conditions set forth in 47 CFR part 74, subpart H.

* * * * *

US300 The frequencies 169.445, 169.505, 169.545, 169.575, 169.605, 169.995, 170.025, 170.055, 170.245, 170.305, 171.045, 171.075, 171.105, 171.845, 171.875, and 171.905 MHz are available for wireless microphone operations on a secondary basis to Federal and non-Federal operations. On center frequencies 169.575 MHz, 170.025 MHz, 171.075 MHz, and 171.875 MHz, the emission bandwidth shall not exceed 200 kHz. On the other center frequencies, the emission bandwidth shall not exceed 54 kHz.

* * * * *

PART 15 – RADIO FREQUENCY DEVICES

3. The authority citation for part 15 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, 304, 307, 336, 544a, and 549.

4. Section 15.37 is amended by revising paragraph (i) and paragraph (k) introductory text to read as follows:

§ 15.37 Transition provisions for compliance with the rules.

* * * * *

(i) As of December 26, 2017, wireless microphones for which an application for certification is filed must comply with the requirements of § 15.236. Manufacturing and marketing of wireless

microphones that would not comply with the rules for operation in §15.236 must cease no later than September 24, 2018. Only wireless microphones certified for operation under this part may be operated under this part as of July 13, 2020.

* * * * *

(k) Disclosure requirements for unlicensed wireless microphones capable of operating in the 600 MHz service band. Any person who manufactures, sells, leases, or offers for sale or lease, unlicensed wireless microphones that are capable of operating in the 600 MHz service band, as defined in this part, on or after July 13, 2017, is subject to the following disclosure requirements:

* * * * *

5. Section 15.203 is revised to read as follows:

§ 15.203 Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236.

Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation

site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

6. Section 15.236 is amended by revising paragraphs (a)(2) through (4), (c)(1), (c)(3), removing and reserving paragraph (c)(4), revising paragraphs (c)(5), (d)(2), and (g) to read as follows:

§ 15.236 Operation of wireless microphones in the bands 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-698 MHz.

* * * * *

(a) * * *

(2) 600 MHz duplex gap. An 11 megahertz guard band at 652-663 MHz that separates part 27 600 MHz service uplink and downlink frequencies.

(3) 600 MHz guard band. Designated frequency band at 614-617 MHz that prevents interference between licensed services in the 600 MHz service band and channel 37.

(4) 600 MHz service band. Frequencies in the 617-652 MHz and 663-698 MHz bands that are reallocated and reassigned for 600 MHz band services under part 27.

* * * * *

(c) * * *

(1) Channels allocated and assigned for the broadcast television service.

* * * * *

(3) The 657-663 MHz segment of the 600 MHz duplex gap.

(4) [Reserved]

(5) The 614-616 MHz segment of the 600 MHz guard band.

* * * * *

(d) * * *

(2) In the 600 MHz guard band and the 600 MHz duplex gap: 20 mW EIRP.

* * * * *

(g) Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in § 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08).

7. Section 15.711 is amended by revising paragraph (a) to read as follows:

§ 15.711 Interference avoidance methods.

* * * * *

(a) Geolocation required. White space devices shall rely on a geolocation capability and database access mechanism to protect the following authorized service in accordance with the interference protection requirements of § 15.712: Digital television stations, digital and analog Class A, low power, translator and booster stations; translator receive operations; fixed broadcast auxiliary service links; private land mobile service/commercial radio service (PLMRS/CMRS) operations; offshore radiotelephone service; low power auxiliary services authorized pursuant to §§ 74.801 through 74.882 of this chapter, including licensed wireless microphones; MVPD receive sites; wireless medical telemetry service (WMTS); radio astronomy service (RAS); and 600 MHz

service band licensees where they have commenced operations, as defined in §27.4 of this chapter. In addition, protection shall be provided in border areas near Canada and Mexico in accordance with §15.712(g).

* * * * *

8. Section 15.713 is amended by removing and reserving paragraph (j)(9) as follows:

§ 15.713 White space database.

* * * * *

(j) * * *

(9) [Reserved]

* * * * *

**PART 74 – EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST AND
OTHER PROGRAM DISTRIBUTIONAL SERVICES**

9. The authority citation for part 74 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, 307, 309, 310, 336, and 554.

10. Section 74.801 is amended by removing the “NOTE TO DEFINITIONS OF 600 MHZ DUPLEX GAP, 600 MHZ GUARD BANDS, AND 600 MHZ SERVICE BAND,” and by revising the definitions of “600 MHz duplex gap,” “600 MHz guard bands,” and “600 MHz service band” to read as follows:

§ 74.801 Definitions.

600 MHz duplex gap. An 11 megahertz guard band at 652-663 MHz that separates part 27 600 MHz service uplink and downlink frequencies.

600 MHz guard band. Designated frequency band at 614-617 MHz that prevents interference between licensed services in the 600 MHz service band and channel 37.

600 MHz service band. Frequencies in the 617-652 MHz and 663-698 MHz bands that are reallocated and reassigned for 600 MHz band services under part 27.

* * * * *

11. Section 74.802 is amended by revising paragraph (a)(1), adding Note to paragraph (a)(1) and revising paragraph (a)(2) to read as follows:

§ 74.802 Frequency assignment.

(a)(1) Frequencies within the following bands may be assigned for use by low power auxiliary stations:

26.100-26.480 MHz

54.000-72.000 MHz

76.000-88.000 MHz

161.625-161.775 MHz (except in Puerto Rico or the Virgin Islands)

174.000-216.000 MHz

450.000-451.000 MHz

455.000-456.000 MHz

470.000-488.000 MHz

488.000-494.000 MHz (except Hawaii)

494.000-608.000 MHz

614.000-698.000 MHz

941.500-944.000 MHz

944.000-952.000 MHz

952.850-956.250 MHz

956.45-959.85 MHz

1435-1525 MHz

6875.000-6900.000 MHz

7100.000-7125.000 MHz

NOTE TO PARAGRAPH (a)(1): Frequency assignments in the 614.000-698.000 MHz band are subject to conditions established in proceedings pursuant to GN Docket No. 12-268. This band is being transitioned to the 600 MHz service band, the 600 MHz guard band, and the 600 MHz duplex gap during the post-incentive auction transition period (as defined in § 27.4 of this chapter), which began on April 13, 2017. Low power auxiliary stations must comply with the applicable conditions with respect to any assignment to operate on frequencies repurposed for the 600 MHz service band, the 600 MHz guard band, and the 600 MHz duplex gap, respectively. This rule will be further updated, pursuant to public notice or subsequent Commission action, to reflect additional changes that implement the determinations made in these proceedings.

(2) The 653.000-657.000 MHz segment of the 600 MHz duplex gap may be assigned for use by low power auxiliary service.

* * * * *

12. Section 74.803 is amended by revising paragraphs (c) and (d) to read as follows:

§ 74.803 Frequency selection to avoid interference.

* * * * *

(c) In the 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 6875.000-6900.000 MHz, and 7100.000-7125.000 MHz bands low power auxiliary station usage is secondary to other uses (e.g. Aural Broadcast Auxiliary, Television Broadcast Auxiliary, Cable Relay Service, Fixed Point to Point Microwave) and must not cause harmful interference. In the 941.5-944 MHz band, low power auxiliary station usage also is secondary to Federal operations in the band. In each of these bands, applicants are responsible for selecting the frequency assignments that are least likely to result in mutual interference with other licensees in the same area. Applicants must consult local frequency coordination committees, where they exist, for information on frequencies available in the area. In selecting frequencies, consideration should be given to the relative location of receive points, normal transmission paths, and the nature of the contemplated operation.

(d) In the 1435-1525 MHz band, low power auxiliary station (LPAS) authorizations are limited to operations at fixed locations, and only to the extent that applicable requirements have been met for the proposed operations at those specified locations.

(1) Each authorization is limited to specific events or situations for which there is a need to deploy large numbers of LPAS for specified time periods, and use of other available spectrum resources at that particular location is insufficient to meet the LPAS licensee's needs.

(2) The access to spectrum in the band must be coordinated with the frequency coordinator for aeronautical mobile telemetry, the Aerospace and Flight Test Radio Coordinating Committee (AFTRCC) prior to operations at the specified location and period of time, with AFTRCC indicating whether any specific frequencies in the band are unavailable for use. LPAS devices must complete authentication and location verification before operations begin, employ software-based controls or similar functionality to prevent devices in the band from operating except in the specific channels, locations, and time periods that have been coordinated, and be capable of being tuned to any frequency in the band.

(3) LPAS users may have access to no more than 30 megahertz of spectrum (one third of the 1435-1525 MHz band) for their operations at the specified locations. Different users in the same general area each can access up to 30 megahertz of spectrum for their respective operations. All licensees that have successfully coordinated with AFTRCC for access to the 1435-1525 MHz band for operations at their specified locations in the same general area must, to the extent necessary, coordinate their particular access to and use of spectrum with other licensees to minimize the potential for interference between and among the different operations.

13. Section 74.831 is revised to read as follows:

§ 74.831 Scope of service and permissible transmissions.

The license for a low power auxiliary station authorizes the transmission of cues and orders to production personnel and participants in broadcast programs, motion pictures, and major

events or productions and in the preparation therefor, the transmission of program material by means of a wireless microphone worn by a performer and other participants in a program, motion picture, or major event or production during rehearsal and during the actual broadcast, filming, recording, or event or production, or the transmission of comments, interviews, and reports from the scene of a remote broadcast. Low power auxiliary stations operating in the 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 6875-6900 MHz, and 7100-7125 MHz bands may, in addition, transmit synchronizing signals and various control signals to portable or hand-carried TV cameras which employ low power radio signals in lieu of cable to deliver picture signals to the control point at the scene of a remote broadcast.

14. Section 74.832 is amended by revising paragraph (d) to read as follows:

§ 74.832 Licensing requirements and procedures.

* * * * *

(d) Cable television operations, motion picture and television program producers, large venue owners or operators, and professional sound companies may be authorized to operate low power auxiliary stations in the bands allocated for TV broadcasting, the 653-657 MHz band, the 941.5-944 MHz band, the 944-952 MHz band, the 952.850-956.250 MHz band, the 956.45-959.85 MHz band, the 1435-1525 MHz band, the 6875-6900 MHz band, and the 7100-7125 MHz band. In the 6875-6900 MHz and 7100-7125 MHz bands, entities eligible to hold licenses for cable television relay service stations (see § 78.13 of this chapter) shall also be eligible to hold licenses for low power auxiliary stations.

* * * * *

15. Section 74.851 is amended by revising paragraphs (i) through (k), and paragraph (l) introductory text to read as follows:

§ 74.851 Certification of equipment, prohibition on manufacture, import, sale, lease, offer for sale or lease, or shipment of devices that operate in the 700 MHz or the 600 MHz Band; labeling for 700 MHz or 600 MHz band equipment destined for non-U.S. markets; disclosures.

* * * * *

(i) As of January 13, 2018, applications for certification shall no longer be accepted for low power auxiliary stations or wireless video assist devices that are capable of operating in the 600 MHz service band or the 600 MHz guard band, or for low power auxiliary stations that are capable of operating in the 600 MHz duplex gap unless the operations are limited to the 653-657 MHz segment.

(j) As of October 13, 2018, no person shall manufacture, import, sell, lease, offer for sale or lease, or ship low power auxiliary stations or wireless video assist devices that are capable of operating in the 600 MHz service band or the 600 MHz guard bands, or low power auxiliary stations that are capable of operating in the 600 MHz duplex gap unless the operations are limited to the 653-657 MHz segment. This prohibition does not apply to devices manufactured solely for export.

(k) As of October 13, 2018, any person who manufacturers, sells, leases, or offer for sale or lease low power auxiliary stations or wireless video assist devices that are destined for non-U.S. markets and that are capable of operating in the 600 MHz service band or the 600 MHz guard bands, or low power auxiliary stations that are capable of operating in the 600 MHz duplex gap

unless such operations are limited to the 653-657 MHz segment, shall include labeling and make clear in all sales, marketing, and packaging materials, including online materials, relating to such devices that the devices cannot be operated in the United States.

(l) Disclosure requirements for low power auxiliary stations and wireless video assist devices capable of operating in the 600 MHz service band. Any person who manufactures, sells, leases, or offers for sale or lease low power auxiliary stations or wireless video devices that are capable of operating in the 600 MHz service band on or after July 13, 2017, is subject to the following disclosure requirements:

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16. Section 74.861 is amended by revising paragraphs (d)(3), (d)(4)(i) through (iii), and (e)(7) to read as follows:

§ 74.861 Technical requirements.

* * * * *

(d) * * *

(3) For the 26.1-26.480 MHz, 161.625-161.775 MHz, 450-451 MHz, and 455-456 MHz bands, the occupied bandwidth shall not be greater than that necessary for satisfactory transmission and, in any event, an emission appearing on any discrete frequency outside the authorized band shall be attenuated, at least, $43 + 10 \log^{10}$ (mean output power, in watts) dB below the mean output power of the transmitting unit. The requirements of this paragraph shall also apply to the applications for certification of equipment for the 944-952 MHz band until January 13, 2018.

(4)(i) For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 1435-1525 MHz, 6875-6900 MHz and 7100-7125 MHz bands, analog emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.1.2 of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08).

(ii) For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, and 1435-1525 MHz bands, digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 4) of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part 1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08).

(iii) In the 6875-6900 MHz and 7100-7125 MHz bands, digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 5) of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part

1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08).

* * * * *

(e) * * *

(7) Analog emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.1.2 of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part 1: Technical characteristics and methods of measurement. Digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 4) of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part 1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08). The requirements of this paragraph (e)(7) shall not apply to applications for certification of equipment in these bands until nine months after release of the Commission's Channel Reassignment Public Notice, as defined in § 73.3700(a)(2) of this chapter.

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PART 87 – AVIATION SERVICES

17. The authority citation for part 87 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 303, and 307(e), unless otherwise noted.

18. Section 87.303 is amended by revising paragraph (d)(1) and adding paragraph (d)(4) to read as follows:

§ 87.303 Frequencies.

* * * * *

(d) * * *

(1) Frequencies in the 1435-1525 MHz and 2360-2395 MHz bands are assigned in the mobile service primarily for aeronautical telemetry and associated telecommand operations for flight testing of aircraft and missiles, or their major components. Until January 1, 2020, the 2345-2360 MHz band is also available to licensees holding a valid authorization on April 23, 2015 for these purposes on a secondary basis. Permissible uses of these bands include telemetry and associated telecommand operations associated with the launching and reentry into the Earth's atmosphere, as well as any incidental orbiting prior to reentry, of objects undergoing flight tests. In the 1435-1525 MHz band, the following frequencies are shared on a co-equal basis with flight telemetering mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, and 1524.5 MHz. In the 2360-2395 MHz band, the following frequencies may be assigned for telemetry and associated telecommand operations of expendable and re-usable launch vehicles, whether or not such operations involve flight testing: 2364.5, 2370.5 and 2382.5 MHz. All other mobile telemetry uses of the 2360-2395 MHz band shall be on a non-interfering and unprotected basis to the above uses.

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(4) Frequencies in the bands 1435-1525 MHz are also available for low power auxiliary station use on a secondary basis.

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PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

19. The authority citation for part 90 continues to read as follows:

AUTHORITY: Sections 4(i), 11, 303(g), 303(r), and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), and 332(c)(7), and Title VI of the Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. 112-96, 126 Stat. 156.

20. Section 90.265 is amended by revising paragraph (b) introductory text and paragraph (b)(1) to read as follows:

§ 90.265 Assignment and use of frequencies in the bands allocated for Federal use.

* * * * *

(b) The following frequencies are available for wireless microphone operations to eligibles in this part, subject to the provisions of this paragraph:

Frequencies (MHz)

169.445

169.505

169.545

169.575

169.605

169.995

170.025

170.055

170.245

170.305

171.045

171.075

171.105

171.845

171.875

171.905

(1) On center frequencies 169.575 MHz, 170.025 MHz, 171.075 MHz, and 171.875 MHz, the emission bandwidth shall not exceed 200 kHz. On the other center frequencies listed in this paragraph (b), the emission bandwidth shall not exceed 54 kHz.

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